

Serial No.: 09/990,127
Docket No.: PHUS007084US

Amendment B

Claim Amendments

This listing of claims will replace all prior versions, and listings, of claims in the application.

1. (Currently Amended) A medical imaging system for conducting an image-guided medical procedure on a subject, the system comprising:
- a medical imaging apparatus for obtaining volumetric images of the subject;
 - means for planning an interventional procedure on a subject using the volumetric images;
 - a mechanical arm assembly disposed in proximity to the medical imaging apparatus, the mechanical arm assembly comprising a base support, a distal end, a plurality of arm segments, and a plurality of joints between the arm segments for carrying out the interventional procedure; and
 - an end-effector disposed at the distal end of the mechanical arm assembly, the end-effector comprising gripping means for selectively gripping a surgical instrument during the interventional procedure with a gripping force ranging from zero to a force which prevents relative movement between the gripping means and the surgical instrument- wherein the end-effector further comprises:
 - a first finger portion having a first gripping surface;
 - a second finger portion having a second gripping surface, the first and second gripping surfaces being opposed to one another for applying a gripping force to the surgical instrument;
 - a first surgical instrument guide disposed on the first finger portion and extending towards the second finger portion; and
 - a second surgical instrument guide disposed on the second finger portion and extending towards the first finger portion.

2. (Presently Cancelled) A medical imaging system according to claim 1 wherein the end-effector further comprises:
- a first finger portion having a first gripping surface;

Serial No.: 09/990,127
Docket No.: PHUS007084US

Amendment B

a second finger portion having a second gripping surface, the first and second gripping surfaces being opposed to one another for applying a gripping force to the surgical instrument;

a first surgical instrument guide disposed on the first finger portion and extending towards the second finger portion; and

a second surgical instrument guide disposed on the second finger portion and extending towards the first finger portion.

3. (Presently Amended) A medical imaging system according to claim 2-1 further comprising incremental movement means for incrementally inserting the surgical instrument along a trajectory into the subject.

4. (Original) A medical imaging system according to claim 3 wherein the trajectory is linear.

5. (Presently Amended) A medical imaging system according to claim 2-1 wherein the gripping force has a magnitude that allows the surgical instrument to be manually inserted into the subject.

6. (Presently Amended) A medical imaging system according to claim 2-1 wherein the first surgical instrument guide applies a first force to the surgical instrument in a direction perpendicular to the first gripping surface and the second surgical instrument guide applies a second force to the surgical instrument in a direction perpendicular to the second gripping surface.

7. (Previously Presented) A medical imaging system according to claim 6 wherein the first force and the second force are substantially zero.

8. (Presently Amended) A method of conducting an image-guided medical procedure on a subject, the method comprising:

generating at least one volumetric image of the subject;

Serial No.: 09/990,127
Docket No.: PHUS007084US

Amendment B

planning an interventional procedure on the subject using the at least one volumetric image;

gripping a surgical instrument with an end-effector, the end-effector being disposed at a distal end of a mechanical arm assembly;

moving the surgical instrument into the subject along a trajectory in accordance with the planned interventional procedure using the mechanical arm assembly; and

releasing the surgical instrument; wherein the step of gripping comprises the steps of:

applying a gripping force to the surgical instrument using a first gripping surface disposed on a first finger portion of the end-effector and a second gripping surface disposed on a second finger portion of the end-effector; and

stabilizing the surgical instrument using a first instrument guide disposed on the first finger portion and a second instrument guide disposed on the second finger portion.

9. (Previously Presented) A method of conducting an image-guided medical procedure according to claim 8 further comprising the steps of:

moving the end-effector away from the subject;

regripping the surgical instrument; and

moving the surgical instrument further along the trajectory.

10. (Previously Presented) A method of conducting an image-guided medical procedure according to claim 9 wherein the trajectory is linear.

11. (Presently Cancelled) A method of conducting an image-guided medical procedure according to claim 8 wherein the step of gripping comprises the steps of:

applying a gripping force to the surgical instrument using a first gripping surface disposed on a first finger portion of the end-effector and a second gripping surface disposed on a second finger portion of the end-effector; and

Serial No.: 09/990,127
Docket No.: PHUS007084US

Amendment B

stabilizing the surgical instrument using a first instrument guide disposed on the first finger portion and a second instrument guide disposed on the second finger portion.

12. (Presently Amended) A method of conducting an image-guided medical procedure according to claim ~~11~~8 wherein the step of stabilizing the surgical instrument has a stabilizing force in a direction perpendicular to the first and second gripping surfaces associated therewith.

13. (Previously Presented) A method of conducting an image-guided medical procedure according to claim 12 wherein the stabilizing force is substantially zero.

14. (Previously Presented) A medical imaging system comprising:
imaging means for generating at least one volumetric image of a subject;
planning means for planning an interventional procedure on the subject;
a mechanical arm assembly disposed in proximity to the imaging means, the mechanical arm assembly comprising a base support, a plurality of arm segments, a plurality of joints, and a distal end;
an end-effector disposed at the distal end of the mechanical arm assembly, the end-effector comprising:
a first finger portion having a first gripping surface;
a second finger portion having a second gripping surface, the first and second gripping surfaces being opposed to one another for applying a gripping force to a surgical instrument;
a first surgical instrument guide disposed on the first finger portion and extending perpendicularly to the first gripping surface; and
a second surgical instrument guide disposed on the second finger portion and extending perpendicularly to the second gripping surface.

15. (Previously Presented) A medical imaging system according to claim 14 further comprising a mechanical arm controller for controlling the mechanical arm such that

Serial No.: 09/990,127
Docket No.: PHUS007084US

Amendment B

the surgical instrument moves along a path in accordance with the planned interventional procedure.

16. (Previously Presented) A medical imaging system according to claim 15 wherein the path comprises a linear trajectory into the subject.

17. (Previously Presented) A medical imaging system according to claim 16 wherein the movement of the surgical instrument along the path includes relative movement between the surgical instrument and the end-effector along the linear trajectory.

18. (Previously Presented) A medical imaging system according to claim 17 further comprising position tracking means for tracking a position of the surgical instrument.

19. (Previously Presented) A medical imaging system according to claim 14 wherein the first surgical instrument guide comprises a first and second prong, the first and second prongs extending past the first gripping surface and the second surgical instrument guide comprises a third and fourth prong, the third and fourth prongs extending past the second gripping surface.